

NEW COMBINATIONS, NEW SYNONYMS, AND TYPIFICATIONS
IN *PSEUDOGNAPHALIUM* (ASTERACEAE: GNAPHALIEAE)
FROM SOUTH AMERICA

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ABSTRACT

Four new combinations are proposed in order to have these names available for the treatment of *Pseudognaphalium* in Chile and for the Flora of Argentina: ***Pseudognaphalium aldunateoides*** (J. Rémy) C. Monti, N. Bayón & S.E. Freire, ***Pseudognaphalium andicola*** (Phil.) C. Monti, N. Bayón & S.E. Freire, both from Argentina and Chile, ***Pseudognaphalium glanduliferum*** (Griseb.) C. Monti, N. Bayón & S.E. Freire, from Argentina, and ***Pseudognaphalium perpusillum*** (Phil.) C. Monti, N. Bayón & S.E. Freire, from Chile. Two taxa are newly synonymized: *G. phaeolepis* Phil. with *G. aldunateoides* J. Rémy, and *G. diminutivum* Phil. with *G. perpusillum* Phil. Lectotypes are here proposed for: *Gnaphalium andicola*, *G. diminutivum* Phil. and *G. phaeolepis* Phil. Additionally, a table featuring diagnostic characters to distinguish between *Gnaphalium* and *Pseudognaphalium* is provided as well as illustrations of phyllaries, achenes, and pappus bristles for each species.

RESUMEN

Se proponen cuatro nuevas combinaciones, a fin de tener disponibles estos nombres para el tratamiento de los *Pseudognaphalium* de Chile y de la Flora de Argentina: ***Pseudognaphalium aldunateoides*** (J. Rémy) C. Monti, N. Bayón & S.E. Freire, ***Pseudognaphalium andicola*** (Phil.) C. Monti, N. Bayón & S.E. Freire, ambos de Argentina y Chile, ***Pseudognaphalium glanduliferum*** (Griseb.) C. Monti, N. Bayón & S.E. Freire, de Argentina, y ***Pseudognaphalium perpusillum*** (Phil.) C. Monti, N. Bayón & S.E. Freire, de Chile. Se cita a *G. phaeolepis* Phil. como nuevo sinónimo de *G. aldunateoides* J. Rémy, y a *G. diminutivum* Phil. como nuevo sinónimo de *G. perpusillum* Phil. y se designan lectotipos para: *Gnaphalium andicola*, *G. diminutivum* Phil. y *G. phaeolepis* Phil. Adicionalmente, se incluyen ilustraciones de filarios, aquenios y pelos del papus para cada especie y una tabla comparativa para distinguir por sus caracteres diagnósticos los géneros *Gnaphalium* y *Pseudognaphalium*.

South American species of *Pseudognaphalium* Kirp. have been typically treated as *Gnaphalium* L. (Cabrera 1963, 1971, 1974, 1978; Dillon & Sagástegui-Alva 1991a, b; Freire 1995, 1998; Bayón 2009). They correspond to the Achyroclinoid cudweeds group (Drury 1970). However, studies of detailed morphological characters (Hilliard & Burt 1981) and studies based on cladistic analysis inferred from morphology (Anderberg 1991) and recent results from molecular studies (Bayer et al. 2007; Ward et al. 2009) have been interpreted as providing support for recognizing Achyroclinoid cudweeds group as a distinct genus *Pseudognaphalium* (e.g., Hilliard 1983, for South African species; Nesom 2001, 2004, 2006; Ballard et al. 2004, for North American species;

Deble & Marchiori 2006; Hind 2011; Freire et al. 2011, for South American species).

We found four combinations necessary for a consistent treatment of the genus during the course of the revision of *Pseudognaphalium* (Monti, in prep.) and the treatment of *Pseudognaphalium* Kirp. in Chile and for the Flora of Argentina (Freire, Bayón, & Monti, in prep.).

MATERIALS AND METHODS

The study is based on herbarium material from the following herbaria (abbreviations according to Thiers 2011): CONC, CORD, LP, MCNS, MCNS, SGO, and SI. Pappus bristles were observed after boiling in water and staining with 2% safranin. Characteristics of phyllaries were observed and recorded in cleared samples using Dizeo de Strittmatter's technique (1973). Observations were carried out using a light microscope (Gemalux), equipped with a photographic camera PAL CCD. Scanning electron microscopy (SEM) imaging was carried out on achene materials that were removed from herbarium sheets, rehydrated in water and fixed in FAA (70% alcohol, formaldehyde and glacial acetic acid, 85 : 10 : 5), then dehydrated through an alcohol series of 90%:96%:100% and critical point dried using EMITECH K850. They were mounted on aluminum stubs with double adhesive tape and coated with gold. Achenes surfaces were photographed using a FEI Quanta 200 scanning electronic microscope at 20 kV.

TAXONOMY

Pseudognaphalium aldunateoides (J. Rémy) C. Monti, N. Bayón & S.E. Freire, comb. nov. *Gnaphalium aldunateoides* J. Rémy, in Gay Fl. Chil. 4:232. 1849. TYPE: CHILE: Santiago, Feb 1839, Gay s.n. (HOLOTYPE: P, internet image! <http://dsiphotomnhn.fr/sonnera2/LAPI/scanL/L20100903/P00704557>).

Gnaphalium phaeolepis Phil., Linnaea 33:168. 1864–1865. TYPE: CHILE: s.loc., Frumau 63, 1865 (LECTOTYPE, designated here: SGO 64452!; ISOLECTOTYPES: SGO 44946!, 44947!), syn. nov.

Observation 1

Gnaphalium phaeolepis Phil. and *G. aldunateoides* J. Rémy are small plants from 5 to 10 cm tall with stems branched from base, and oblong to linear leaves. According to the protologue, *Gnaphalium phaeolepis* differs from *G. aldunateoides* by its brown tipped phyllaries (vs. whitish tipped in *G. aldunateoides*). After examining the type materials, we considered this character to be within the range of variation for *G. aldunateoides*. Consequently, *Gnaphalium phaeolepis* Phil. is now considered to be a synonym of *G. aldunateoides*.

Observation 2

The type designated in the protologue of *Gnaphalium phaeolepis* Phil., “In Pascuis prope Osorno crescit” has not been located at B, F, K, LP, NY or SGO and no illustration was published with the name. The specimen “Frumau 63, year 1865” kept at SGO (SGO 64452), which is in accordance with the protologue and has Philippi's annotations, is here selected as the lectotype.

Observation 3

Even if Anderberg (1991) left *Gnaphalium aldunateoides* in *Gnaphalium*, we moved this taxon to *Pseudognaphalium* since it has divided stereome (Fig. 1A) as this is the primary way to differentiate between *Pseudognaphalium* and *Gnaphalium*.

Pseudognaphalium andicola (Phil.) C. Monti, N. Bayón & S.E. Freire, comb. nov. *Gnaphalium andicola* Phil., Anales Univ. Chile 90:17. 1895. TYPE: CHILE. SANTIAGO: Las Condes, L. Navarro s.n. (LECTOTYPE, designated here: SGO 64481!).

Observation

Philippi (1895: 17) mentioned two syntypes in the protologue of *Gnaphalium andicola* “Las Condes, prov. Santiago, Cajón del Lontué, prov. Curicó.” Both syntypes are kept at SGO: Las Condes, prov. Santiago, Lautaro Navarro, SGO 64481 (sub SGO 64384 in Muñoz Pizarro 1960: 141) and Cajón de Lontué, prov. Curicó, Januari 1882, SGO 64385. We selected as lectotype SGO 64481, which presents the most complete plant and matches the description in the protologue.

Pseudognaphalium glanduliferum (Griseb.) C. Monti, N. Bayón & S.E. Freire, comb. nov. *Gnaphalium glandu-*

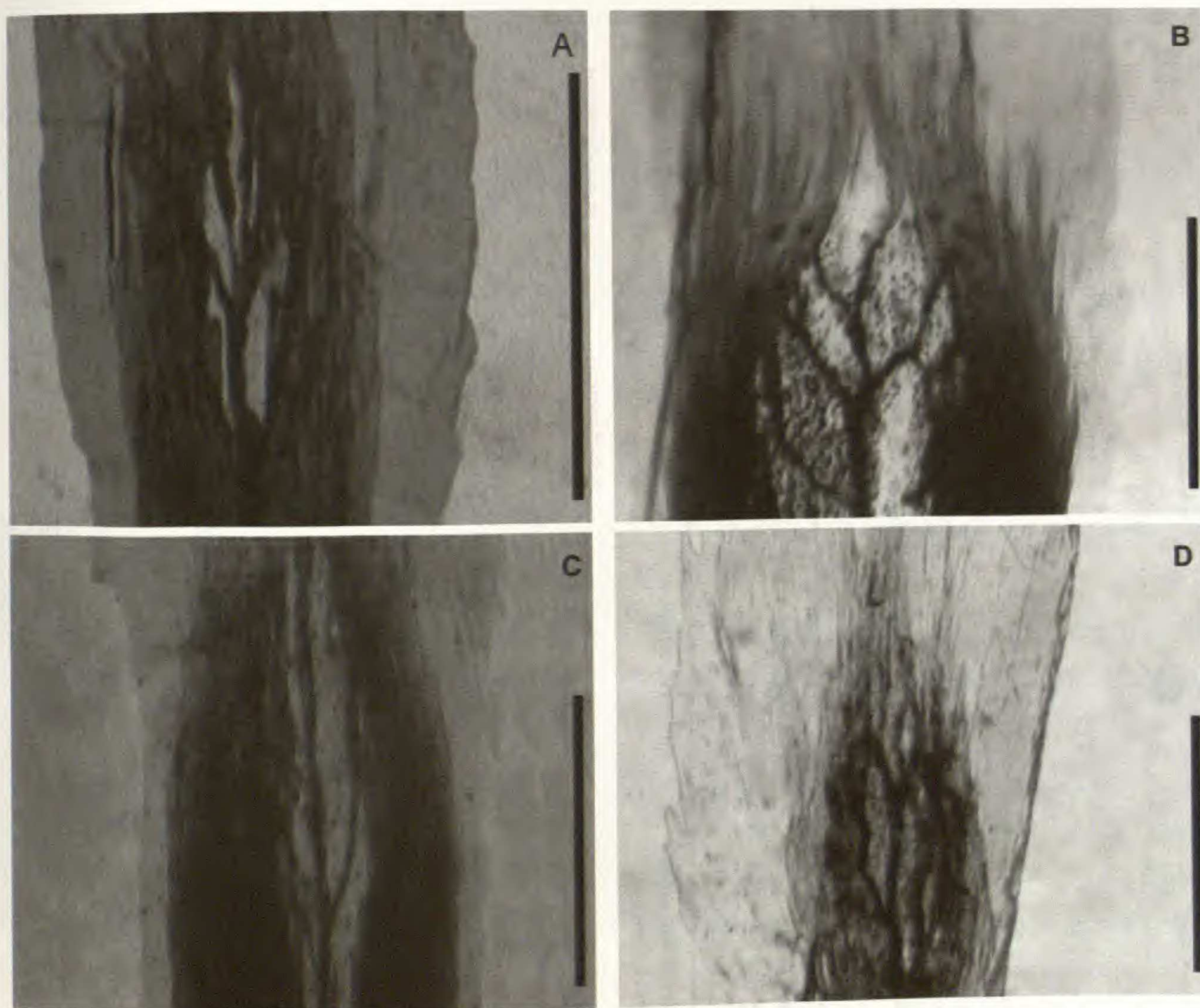


FIG. 1. Phyllaries showing the divided stereome. **A.** *Pseudognaphalium aldunateoides* (Matthei & Quezada 1420, CONC). **B.** *P. andicola* (Teillier & Márquez 5315, CONC). **C.** *P. glanduliferum* (Hunziker 19195, CORD). **D.** *P. perpusillum* (Teillier 5112, CONC). Scale bars: A–D = 0.5 mm.

liferum Griseb., Abh. Königl. Ges. Wiss. Göttingen 24:186. 1879, non Sch. Bip. TYPE: ARGENTINA. SALTA: Alrededores de los Potreros al pie del Nevado del Castillo, 24 Mar 1873, P.G. Lorentz & G.H.E.W. Hieronymus 146 (HOLOTYPE: GOET, internet image! [https://gwdu64.gwdg.de/pls/herbar/typen\\$typen.QueryViewByKey?P_ID=6236&Z_CHK=5074](https://gwdu64.gwdg.de/pls/herbar/typen$typen.QueryViewByKey?P_ID=6236&Z_CHK=5074); ISOTYPES: B (probably destroyed), internet image! <http://plants.jstor.org/specimen/f0bn015098>, CORD, internet image! <http://plants.jstor.org/specimen/cord00006463>, LP!).

Observation

The name *Gnaphalium glanduliferum* has an earlier author, i.e. *G. glanduliferum* Sch. Bip., Bot. Zeitung (Berlin) 3:173. 1845, which is a synonym of *Helichrysum glanduliferum* Sch.Bip. ex Boiss., Fl. Orient. [Boissier] 3:236. 1875.

Pseudognaphalium perpusillum (Phil.) C. Monti, N. Bayón & S.E. Freire, comb. nov. *Gnaphalium perpusillum* Phil., Linnaea 29:6. 1857–1858. TYPE: CHILE. COQUIMBO: Sotaqui, Jan 1837, Gay 739 (HOLOTYPE: SGO 64448!).

Gnaphalium diminutivum Phil., Linnaea 33:167. 1864–1865. TYPE: CHILE. COLCHAGUA: Cerro del Volcán, Feb 1861, W. Díaz s.n. (LECTO-TYPE, designated here: SGO 64454!; ISOLECTOTYPE: SGO 44923!), nov. syn.

Observation 1

Gnaphalium diminutivum Phil. and *G. perpusillum* Phil. are small plants from 1 to 5 cm tall with simple stems, and linear leaves. According to the protologue, *Gnaphalium diminutivum* differs from *G. perpusillum* by its longer stems ca. 2.5 cm alt. (vs. 1.5 cm alt in *G. perpusillum*). After examining the type materials, we considered this character to be within the range of variation for *G. perpusillum*. Consequently, *Gnaphalium diminutivum* Phil. is now considered to be a synonym of *G. perpusillum*.

TABLE 1. Morphological comparison between *Gnaphalium* and *Pseudognaphalium*.

Characters	Drury (1970)		Hilliard & Burt (1981)		Anderberg (1991)	
	<i>Gnaphalium</i> (<i>Gnaphalioid</i> cudweeds subgroup b)	<i>Achyrocline</i> & <i>Achyroclinoid</i> cudweeds	<i>Gnaphalium</i> (incl. <i>Gamochoaeta</i>)	<i>Pseudognaphalium</i>	<i>Gnaphalium</i>	<i>Pseudognaphalium</i>
Capitula arrangement	terminal and axillary leafy clusters	leafless clusters in corymbs or panicles	terminal and axillary leafy clusters	clusters in corymbs	few capitula in clusters sometimes leafy	small clusters in loose corymbs
Phyllary lamina	polychromous	monochromous	—	—	polychromous	monochromous
Phyllary stereome	undivided or with thin streak	divided	undivided or with thin streak	divided	undivided	divided
Corolla of bisexual florets	yellow with red- purple teeth	yellowish	—	—	yellow with red-purple teeth	yellow
Achenial epidermis	smooth	with imbricate papillae	—	with imbricate papillae	papillate	smooth or with imbricate papillae
Achenial hairs	elongate myxogenic	normally glabrous	glabrous or with duplex hairs	glabrous or with duplex hairs	glabrous or with clavate duplex hairs	glabrous or with clavate duplex hairs
Pappus (tip cells)	pointed or subclavate	subclavate	mono or dimorphic	monomorphic (subclavate)	dimorphic (bisexual florets subclavate)	monomorphic (subclavate)
Pappus (base)	without cilia	with cilia	nude or with small cilia	with cilia	with cilia	with cilia

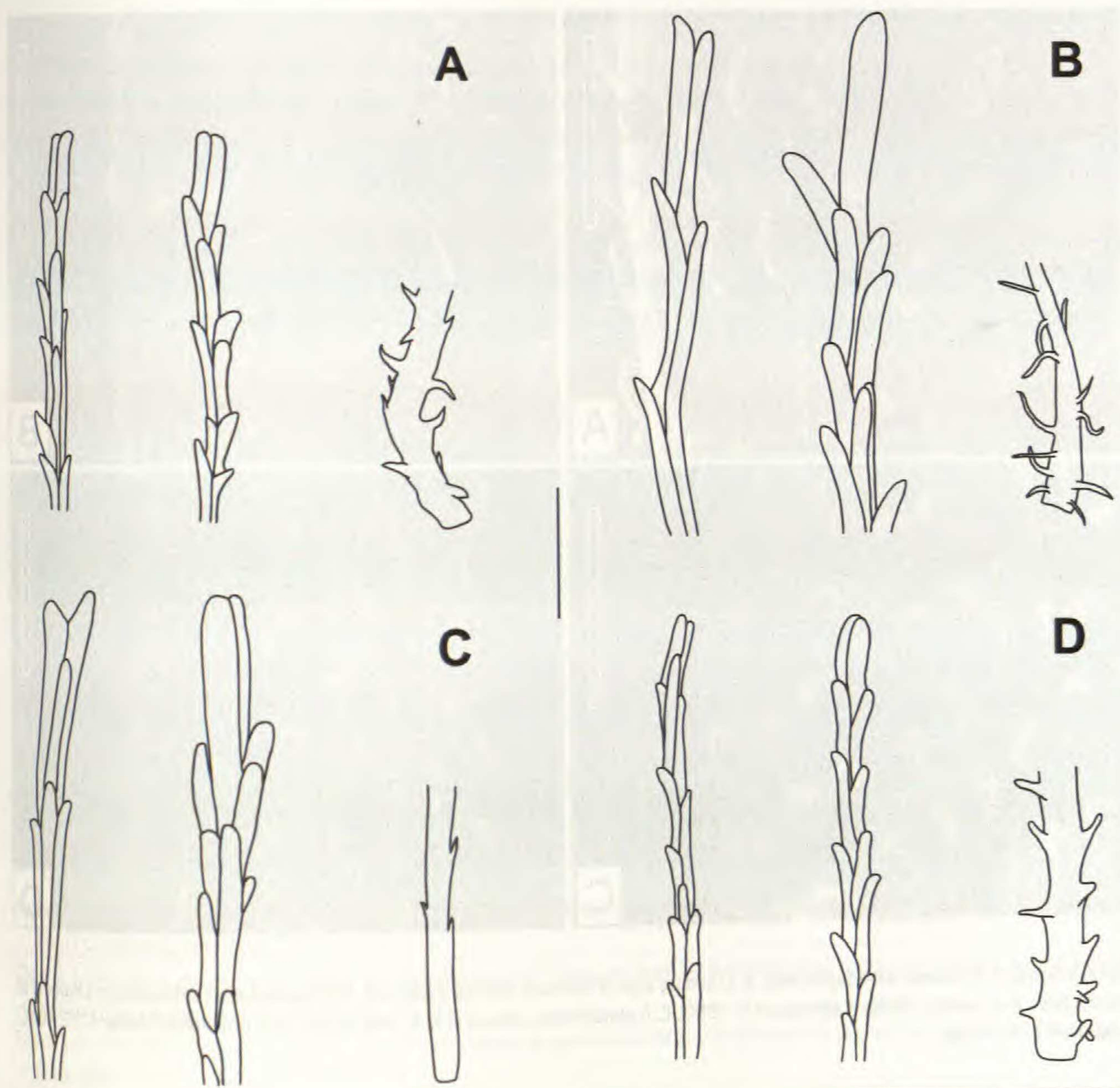


FIG. 2. Pappus bristles showing tip cells and basal portion (left to right: pappus bristle of female floret, pappus bristle of bisexual floret, basal portion of female and bisexual florets). **A.** *Pseudognaphalium aldunateoides* (Urtubey et al. 700, SI). **B.** *P. andicola* (Burkart 9491, SI). **C.** *P. glanduliferum* (Hunziker 19195, CORD). **D.** *P. perpusillum* (Teillier & Márquez 5316, CONC). Scale bar: A–D = 0.1 mm.

Observation 2

Even if no herbarium was mentioned for the type specimen in the protologue of *Gnaphalium perpusillum*, according to Stafleu and Cowan (1979), Philippi's types are found in herbarium SGO.

Observation 3

Philippi (1864: 167) mentioned in the protologue of *Gnaphalium diminutivum* "Cerro del Volcan ad originem fluvii Tinguiguirica". Because there are two sheets kept at SGO for type collection of *G. diminutivum*, we propose the specimen SGO 64454 as lectotype, which presents the most complete plants, and matches the description in the protologue.

DISCUSSION

In his classificatory study of the genus *Gnaphalium* as currently defined, Drury (1970) recognizes two extraneous elements: achyroclinoid and anaphalioid cudweeds.

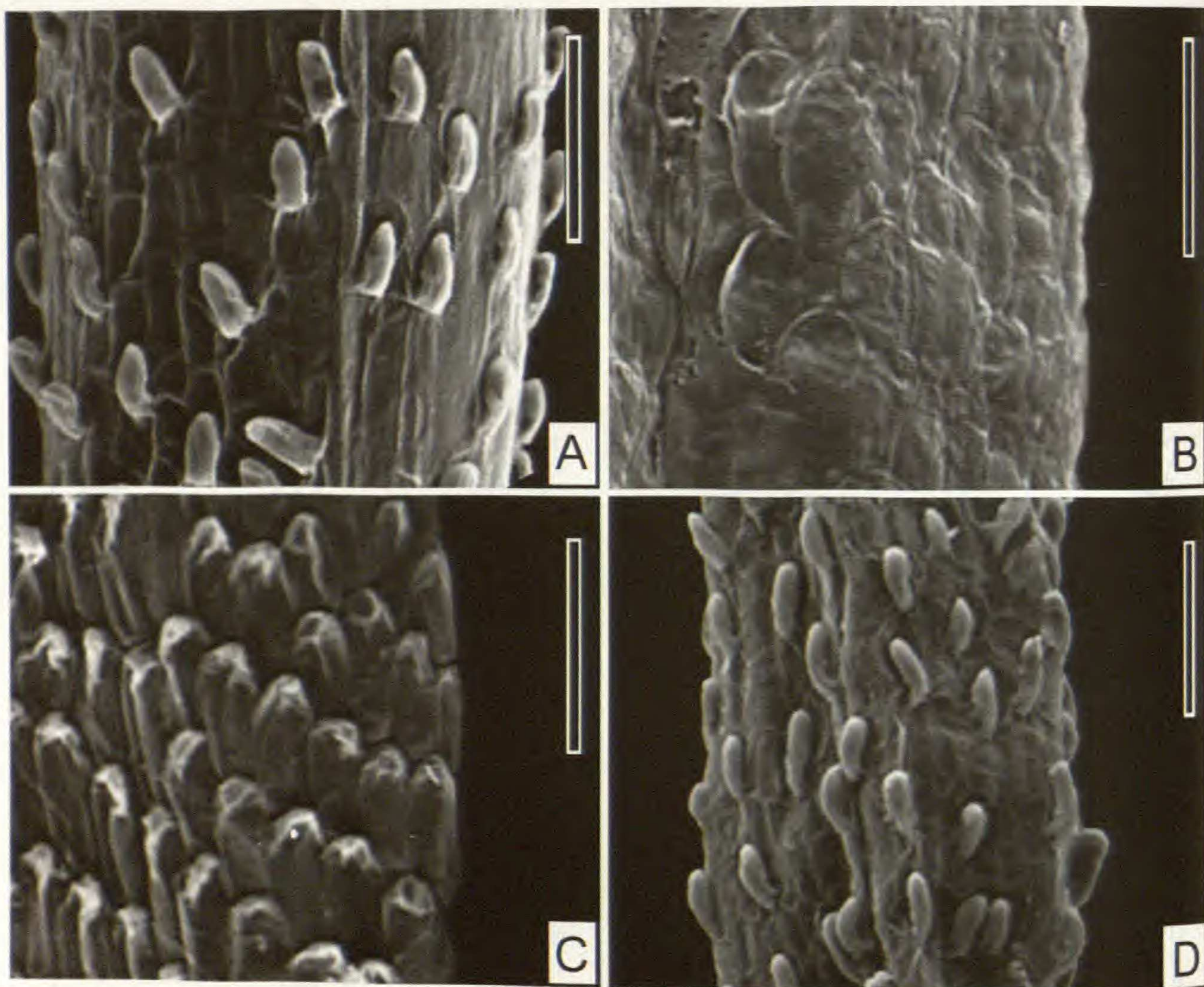


FIG. 3. Achenes. A, D, Achenes with duplex hairs; B, C, Surface view of imbricate achenial papillae. A. *Pseudognaphalium aldunateoides* (Mihoc et al. 6227, CONC). B. *P. andicola* (Teillier & Márquez 5315, CONC). C. *P. glanduliferum* (Novara et al. in 1980, MCNS). D. *P. perpusillum* (Teillier 5112, CONC). Scale bars: A–D = 50 μ m

The former was characterized by having monochromous phyllaries with divided stereomes, yellowish florets, pappus bristles subclavate at the tip with bases cohering by patent cilia, papillate achenes and capitula arranged in corymbs or panicles. Subsequently, Hilliard and Burt (1981), following Drury (1970), transferred nine South African species from *Gnaphalium* to the monotypic genus *Pseudognaphalium* Kirp. Anderberg (1991), in his worldwide revision of Gnaphalieae, also recognized the genus *Pseudognaphalium* and added more than 70 species to it. Morphological comparison between *Gnaphalium* and *Pseudognaphalium* is shown in Table 1.

In this paper, four species are transferred from *Gnaphalium* to *Pseudognaphalium* owing to monochromous phyllaries with divided stereomes (Fig. 1); monomorphic (or slightly dimorphic) pappus bristles, subclavate at the tip (Fig. 2); clusters of capitula arranged in corymbs; achenial epidermis glabrous and papillate (*P. andicola* and *P. glanduliferum*, Fig. 3); or oblong duplex myxogenic hairs (*P. aldunateoides*, *P. perpusillum*, Fig. 3). These traits are considered to be diagnostic features for *Pseudognaphalium* (Anderberg 1991). However, the corollas with red purple teeth of two species (*P. aldunateoides*, *P. perpusillum*), and pappus bristles smooth at the base of *P. glanduliferum* (Fig. 2), do not match the features of *Pseudognaphalium* (Anderberg 1991).

ACKNOWLEDGMENTS

We thank Randall Bayer and an anonymous reviewer for useful comments on a first draft of the manuscript. We are indebted to the curators of the Museo Nacional de Historia Natural de Santiago, Chile (SGO); Universidad de Concepción, Chile (CONC); Instituto de Botánica Darwinion, San Isidro, Argentina (SI); Museo Botánico de Córdoba, Argentina (CORD); Museo de La Plata, Argentina (LP); and Museo de Ciencias Naturales de Salta, Argentina (MCNS) for the loan of specimens. The authors are grateful to María Alejandra Migoya (LPAG) for inking the illustration of pappus bristles and preparing the figures. Financial support was provided by Consejo Nacional de Investigaciones Científicas y Técnicas (CONICET), Argentina and Programa de Incentivos, Decreto 2427/93, Secretaría de Política Universitaria del Ministerio de Educación de la Nación, Argentina.

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